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**IN THE CLAIMS:**

Please cancel claims 20 and 33, 34, and 36 without prejudice.

Please re-write the claims to read as follows:

- 1 1. (Original) A method for enabling out-of-order processing of contexts by processors  
2 of a multiprocessor system, the processors arrayed as a plurality of clusters embedded  
3 between input and output buffers, the method comprising the steps of:  
4 assigning each context a queue identifier (ID) and a sequence number, the queue  
5 ID uniquely identifying a flow of the context and the sequence number denoting an order  
6 of the context within the flow;  
7 distributing the contexts from the input buffer to the clusters;  
8 allowing out-of-order context processing among the clusters for contexts having  
9 different queue IDs; and  
10 enforcing first in, first out (FIFO) synchronization context processing among the  
11 clusters for contexts having the same queue ID.
- 1 2. (Original) The method of Claim 1 wherein the step of assigning comprises the step of  
2 deriving the queue ID using information that enables identification of dependencies  
3 among the contexts.
- 1 3. (Previously Presented) The method of Claim 1, further comprising:  
2 transforming flow parameters of a context to the queue ID in accordance with a  
3 hash function.

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1 4. (Original) The method of Claim 1 wherein the step of assigning comprises the step of  
2 incrementing a predetermined value to generate the sequence number.

1 5. (Original) The method of Claim 1 further comprising the step of coupling an input  
2 sequence controller to the input buffer and an output sequence controller to the output  
3 buffer.

1 6. (Original) The method of Claim 5 further comprising interconnecting the input and  
2 output sequence controllers with a data structure that maintains a list of active flows in  
3 the system.

1 7. (Original) The method of Claim 6 wherein the data structure is a content addressable  
2 memory (CAM) having a plurality of entries.

1 8. (Original) The method of Claim 6 further comprising the step of providing a queue  
2 field and a minimum sequence field within each entry of the data structure.

1 9. (Original) The method of Claim 8 further comprising the step of executing an input  
2 function at the input sequence controller to update the data structure with the sequence  
3 number and queue ID associated with a new context.

1 10. (Original) The method of Claim 9 wherein the step of updating comprises the steps  
2 of:

3 storing the queue ID in the queue ID field of an appropriate entry; and  
4 storing a lowest sequence number of a context for a flow that is active in the sys-  
5 tem in the minimum sequence field of the entry.

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1 11. (Original) The method of Claim 10 wherein the step of storing a lowest sequence  
2 number comprises the step of setting the content of the minimum sequence field to the  
3 assigned sequence number of the first context of a flow.

1 12. (Original) The method of Claim 8 further comprising the step of executing an out-  
2 put function at the output sequence controller to validate one of the out-of-order proc-  
3 essing and FIFO synchronization processing of the contexts.

1 13. (Original) Apparatus for enabling out-of-order processing of contexts by processors  
2 of a processing engine, the processors arrayed as a plurality of clusters, the apparatus  
3 comprising:

4 a hash function adapted to transform flow parameters of a context to a queue  
5 identifier (ID) that uniquely identifies a flow of the context;

6 an incrementor coupled to the hash function and configured to increment a pre-  
7 determined value to generate a sequence number denoting an order of the context within  
8 the flow;

9 an input buffer of the processing engine coupled to the hash function and incre-  
10 mentor, the input buffer distributing the contexts to the clusters; and

11 a sequence control mechanism that allows out-of-order context processing among  
12 the clusters for contexts having different queue IDs and enforces first in, first out (FIFO)  
13 synchronization context processing among the clusters for contexts having the same  
14 queue ID.

1 14. (Original) The apparatus of Claim 13 wherein the sequence control mechanism  
2 comprises an input sequence controller coupled to the input buffer and an output se-  
3 quence controller coupled to an output buffer of processing engine.

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1 15. (Original) The apparatus of Claim 14 wherein the sequence control mechanism  
2 further comprises a data structure coupled between the input and output sequence con-  
3 trollers, the data structure maintaining a list of active flows in the system.

1 16. (Original) The apparatus of Claim 15 wherein the data structure is a content ad-  
2 dressable memory (CAM) having a plurality of entries, each entry including a queue field  
3 that stores the queue ID of a context and a minimum sequence field that stores a lowest  
4 sequence number of a context for a flow that is active in the engine.

1 17. (Original) A computer readable medium containing executable program instructions  
2 for enabling out-of-order processing of contexts by processors of a processing engine, the  
3 processors arrayed as a plurality of clusters embedded between input and output buffers,  
4 the executable program instructions comprising program instructions for:

5 assigning each context a queue identifier (ID) and a sequence number, the queue  
6 ID uniquely identifying a flow of the context and the sequence number denoting an order  
7 of the context within the flow;

8 distributing the contexts from the input buffer to the clusters;

9 allowing out-of-order context processing among the clusters for contexts having  
10 different queue IDs; and

11 enforcing first in, first out (FIFO) synchronization context processing among the  
12 clusters for contexts having the same queue ID.

1 18. (Original) The computer readable medium of Claim 17 further comprising program  
2 instructions for executing an input function at an input sequence controller coupled to the  
3 input buffer, the input function updating a data structure with the sequence number and  
4 queue ID associated with a new context, the data structure maintaining a list of active  
5 flows in the processing engine.

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1 19. (Original) The computer readable medium of Claim 18 further comprising program  
2 instructions for executing an output function at an output sequence controller coupled to  
3 the output buffer, the output function validating one of the out-of-order processing and  
4 FIFO synchronization processing of the contexts.

1 20. Cancelled

1 21. (Previously Presented) Apparatus to enable out-of-order processing of contexts by  
2 processors of a multiprocessor system, comprising:  
3 input and output buffers, the processors arrayed as a plurality of clusters embed-  
4 ded between the input and output buffers;  
5 means for assigning each context a queue identifier (ID) and a sequence number,  
6 the queue ID uniquely identifying a flow of the context and the sequence number denot-  
7 ing an order of the context within the flow;  
8 means for distributing the contexts from the input buffer to the clusters;  
9 means for allowing out-of-order context processing among the clusters for con-  
10 texts having different queue IDs; and  
11 means for enforcing first in, first out (FIFO) synchronization context processing  
12 among the clusters for contexts having the same queue ID.

1 22. (Currently Amended) The apparatus of Claim 21 [[1]], further comprising:  
2 means for deriving the queue ID using information that enables identification of  
3 dependencies among the contexts.

1 23. (Currently Amended) The apparatus of Claim 21 [[1]], further comprising:  
2 means for transforming flow parameters of a context to the queue ID in accor-  
3 dance with a hash function.

1 24. (Currently Amended) The apparatus of Claim 21 [[1]], further comprising:

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2 means for incrementing a predetermined value to generate the sequence number.

1 25. (Currently Amended) The apparatus of Claim 21 ~~[[1]]~~, further comprising:

2 means for coupling an input sequence controller to the input buffer and an output  
3 sequence controller to the output buffer.

1 26. (Currently Amended) The apparatus of Claim 21 ~~[[1]]~~, further comprising:

2 means for interconnecting the input and output sequence controllers with a data  
3 structure that maintains a list of active flows in the system.

1 27. (Previously Presented) The apparatus of Claim 26, further comprising:

2 the data structure is a content addressable memory (CAM) having a plurality of  
3 entries.

1 28. (Previously Presented) The apparatus of Claim 26, further comprising:

2 means for providing a queue field and a minimum sequence field within each en-  
3 try of the data structure.

1 29. (Previously Presented) The apparatus of Claim 28, further comprising:

2 means for executing an input function at the input sequence controller to update  
3 the data structure with the sequence number and queue ID associated with a new context.

1 30. (Previously Presented) The apparatus of Claim 29, further comprising:

2 means for storing the queue ID in the queue ID field of an appropriate entry; and  
3 means for storing a lowest sequence number of a context for a flow that is active  
4 in the system in the minimum sequence field of the entry.

1 31. (Currently Amended) The apparatus of Claim 30 ~~[[10]]~~, further comprising:

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2 means for setting the content of the minimum sequence field to the assigned se-  
3 quence number of the first context of a flow.

1 32. (Currently Amended) The apparatus of Claim 28 [[25]], further comprising:

2 means for executing an output function at the output sequence controller to vali-  
3 date one of the out-of-order processing and FIFO synchronization processing of the con-  
4 texts.

33. Cancelled

1 34. Cancelled

1  
2 35. (Currently Amended) Electromagnetic signals propagating on a computer network,  
3 comprising:

4 said electromagnetic signals carrying instructions for execution on a processor for  
5 the practice of the method of [[claim 1]] enabling out-of-order processing of contexts by  
6 processors of a multiprocessor system, the processors arrayed as a plurality of clusters  
7 embedded between input and output buffers, the method having the steps of;

8 assigning each context a queue identifier (ID) and a sequence number, the queue  
9 ID uniquely identifying a flow of the context and the sequence number denoting an order  
10 of the context within the flow;

11 distributing the contexts from the input buffer to the clusters;

12 allowing out-of-order context processing among the clusters for contexts having  
13 different queue IDs; and

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14 enforcing first in, first out (FIFO) synchronization context processing among the  
15 clusters for contexts having the same queue ID.

1 36. Cancelled